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ABSTRACT

This article reviews the research on the simplification of reading materials for second language (SL) learners and reports on an experiment of the effects of text simplification and elaboration on the reading comprehension of SL learners. Elaboration can improve the comprehensibility of texts without removing new linguistic forms that students need to learn or diluting the semantic content of the original. A review of the research suggests that linguistic simplification of texts fails on both counts, producing unnatural target language models. A study involving 483 Japanese college students studying English as a Foreign Language (EFL) for at least 8 years was conducted to determine their reading comprehension of unmodified, simplified, and elaborated texts. The study found that students who read the simplified passages scored higher on a multiple-choice comprehension test than students who read the unmodified version. Students who read the elaborated versions of the passages scored higher than those who read the unmodified versions, but not statistically significantly so. It also found that there was no statistically significant difference between the reading scores of students who read the simplified and elaborated versions of the passages. (MDM)

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MODIFICATIONS THAT PRESERVE LANGUAGE AND CONTENT

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MODIFICATIONS THAT PRESERVE LANGUAGE AND CONTENT

Michael H Long and Steven Ross

Abstract

An optimal procedure for modifying spoken or written texts for non-native speakers would be one that improves their comprehensibility without (a) removing new linguistic forms which students need to learn from the input, or (b) diluting the semantic content of the original. Linguistic simplification, the traditional approach to text modification, fails on both counts and often produces unnatural target language models. A review of research and the results of a new study show that elaborative modification provides a viable alternative which suffers from neither limitation.

Approaches to Text Modification

Despite increasing doubts as to its effectiveness in aiding comprehension or language learning, linguistic simplification remains the dominant approach to text modification in commercially published reading materials for second and foreign language (L2) learners. Spoken or written texts originally intended for native speakers are rewritten in shorter, simpler sentences that avoid idiomatic expressions, complex syntax and low frequency vocabulary items. In principle, at least, an informal conversation among friends, the report of a scientific experiment, a high school social studies text book, a political speech, a short story by Orwell or a Shakespeare play can all be reduced in complexity to a point at which they become intelligible to false beginners. In a common variant of the process used by several ESL publishers, (re)writers not only remove complex language in the ways indicated, but also contrive to have the simplified versions utilize only pre-specified structures and verb tenses and a particular list of (say) 800 words.

The products of linguistic simplification - basal readers for children and 'structural', or 'graded', readers for adults - present learners with target language models that tend to be stilted and which are always unnatural in another sense, since native speakers do not control their speech or writing linguistically in this systematic way, even when communicating with young children or non-native

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speakers, although they do, of course, make other kinds of modifications. Further, research has shown that while linguistically simplified passages are generally easier to understand overall, shorter sentences are not necessarily easier if users of longer ones maintain clear references to unfamiliar concepts, remove pronouns with unclear antecedents, delete irrelevant details in distracting phrases, and highlight important points through pausing, stress, topicalization and other devices (Davison, Wilson and Hermon, 1985; Beck, McKeown, Omanson and Pople, 1984; Anderson and Davison, 1988; Davison and Green, 1988).

An additional serious limitation of linguistically simplified texts concerns their decreased value for language learning (as opposed to comprehension). Removal of unknown linguistic forms inevitably denies learners access to the very items they need to learn. The purpose of most reading lessons, after all, is not the comprehension of a particular text, but the learning of the language in which the text is written and the development of transferable reading skills.

An alternative approach to adjusting spoken or written input for foreign or second language learners, elaborative modification, builds on research findings in a range of languages on the adjustments native speakers make to facilitate non-native comprehension in non-instructional talk (for review, see Long, 1983a; Larsen-Freeman and Long, 1991). The adjustments are of two kinds: linguistic and conversational.

Linguistic adjustments can occur in all domains and affect the forms learners hear (or read). Where phonology is concerned, NSs addressing NNSs use a slower rate of delivery, more careful articulation, stress of key words and pauses before and after them, more full forms and fewer contractions. Morphological and syntactic changes include use of fewer words and clauses per utterance, preference for canonical word order, retention of usually deleted optional constituents, overt marking of grammatical relations, and higher frequencies of questions of certain types. In the semantic domain, researchers find more overt marking of semantic relations, a lower type-token ratio and fewer idiomatic expressions (occasionally resulting in marked uses of lexical items, such as to have money, rather than to earn money), and fewer opaque forms, e.g. a preference for full NPs over pronouns and concrete over dummy verbs, like do.

Conversational adjustments affect both the content and interactional structure of foreigner talk discourse. Where content is concerned, conversation with NNSs tends to have more of a here-and-now orientation, to treat a more predictable, narrower range of topics and to do so more briefly, e.g. by dealing with fewer information bits and by maintaining a lower ratio of topic-initiating to topic-

continuing moves. The interactional structure of NS-NNS conversation is marked by more abrupt topic-shifts, more use of questions for topic-initiating moves, more repetition of various kinds (including semantic repetition, or paraphrase), and a higher frequency of comprehension checks, confirmation checks, clarification requests, expansions, question-and-answer strings and decomposition.

Conversational adjustments are more frequent and pervasive than linguistic adjustments and sometimes occur when the latter do not (Long, 1980, 1983b), the opposite state of affairs to that prevailing in language teaching materials. The effect of conversational adjustments is to elaborate the input, maintaining much of the original (baseline NS) complexity in both lexis and syntax, but compensating for this by clarifying message content and structure, e.g. through greater topic saliency and use of topic-comment, rather than subject-predicate constructions, and by adding redundancy, e.g. through the use of repetition, paraphrase and the retention of full noun phrases that would be unnecessary for a competent NS reader.

As an example of each approach, simplification and elaboration, consider 1 - 3 below from Ross, Long and Yano (1991).

(1) NS baseline version

Because he had to work at night to support his family, Paco often fell asleep in class.

(2) Simplified version

Paco had to make money for his family. Paco worked at night. He often went to sleep in class.

(3) Elaborated version

Paco had to work at night to earn money to support his family, so he often fell asleep in class next day during his teacher's lesson.

To produce (3), the first clause in the original has been promoted from subordinate to main clause, Paco has been fronted in order to facilitate early identification of the topic, to earn money has been added to help indicate the meaning of support, next day added to help confirm the temporal/causal relationship between the night work and Paco's tiredness, and during his teacher's lesson added to clarify in class. For readers of lower L2 proficiency, Paco might be repeated in the subordinate clause in place of the pronoun he. While rather "wordy", (3), we would claim, sounds more

like a natural sample of spoken or written English, and therefore provides a more useful language learning model, than (2). This is the typical result of elaborative modification, and compares favorably with the choppy, stilted version produced by linguistic simplification.

Equally typical consequences of the two approaches to text modification are the greater length, syntactic and lexical complexity of elaborated texts, compared with simplified ones, and, as is the case here, sometimes even compared with the baseline NS versions. The NS version, (1), is a single sentence containing 17 words, two clauses and four s-nodes. The simplified version, (2), has three sentences, 19 words and five s-nodes. The elaborated version, (3), is a single sentence containing 26 words and five s-nodes. Thus, (on the basis of these tiny text fragments) the average numbers of words (6.33) and s-nodes (1.66) per sentence in the simplified version are both much lower than in the other two. The average numbers of words (26) and s-nodes (5) per sentence in the elaborated version are higher than those (17 and 4) in the NS baseline version. The elaborated version also retains the original lexical items and their collocations, support (his family) and fell asleep, from the NS version, and provides an additional native-like model, earn money, in the course of paraphrasing support. The simplified version removes support and fell asleep from the input, substitutes the (in these contexts) slightly marked usages, make money and went to sleep, and models nothing else that was not in the original version. These patterns of difference among the three text types prevailed in the study to be reported below.

Previous Research on Simplification and Elaboration

There had been 16 studies of the effects of simplification and elaboration on foreign or second language text comprehension when the study reported here was conducted, 11 of listening and five of reading comprehension (see Figure 1).

Figure 1: Studies of the effect of input modification on non-native speaker comprehension (from Ross, et al, 1991)

Study	Text/modification types	level/n	measure	results
	LISTENING COMPREHENSION STUDIES			
Cervantes 1983	A. NS text B. Repeated text	university ESL n=16	dictation	B>A
Long 1985 2 studies	A. NS text B. FT version less complex (1.68 vs. 1.94 s/TU) slower rate (128 vs. 139 wpm) rephrasings	university ESL n=34 n=106	m. choice while listening	B>A p* B>A
Kelch 1985	A. NS text (191 wpm) B. Slower rate (124 wpm) C. FT version (200 wpm + repetition) D. FT version + slower rate (140 wpm + repetition)	university ESL n=26	dictation exact wd. scoring equiv. meaning scoring	 B,D>A,C B,D>A,C D>C p* B,D>A,C
Speidel, Tharp & Kobayashi 1985	A. Complex syntax B. Simple syntax	2nd grade SE & HCE n=120	m. choice after listening	n.s.
Mannon 1986	A. Live lecture to NSs, (123 wpm, 1.99 s/TU, 16 repetitions) B. Live lecture to NNSs, (112 wpm, 1.72 s/TU, 28 repetitions)	university ESL n=28	m. choice after listening	n.s. (B>A trend)
Pica, Doughty & Young 1986	A. Modified input B. Modified interaction	university ESL n=16	choice & location of objects in game	B>A
Fujimoto, Lubin, Sasaki & Long 1986	A. NS passage (140 wpm, 2.11 s/TU) B. Modified input (117 wpm, 1.15 s/TU) C. Modified inter-	university ESL n=53	m. choice after listening	B>A

	action (124 wpm, 2.15 s/TU, paraphrases, repetitions)			
Chaudron & Richards 1986	A. Normal lecture B. Micro-level discourse markers C. Macro-level discourse markers D. Micro- & macro-level markers	university ESL n=146	clc call liste.	
Blau 1990 2 studies	Study 1: 18 texts A. Complex sentences, no surface cues (145 & 170 wpm) B. Complex sentences + surface str. cues (145 & 170 wpm) C. Simple sentences + surface str. cues (145 & 170 wpm)	university EFL Poland n=72 university ESL Puerto Rico n=100	m. choice after listening	C oth. in 1 sampl only
	Study 2: 3 monologs A. 200 wpm B. 185 wpm C. 150 wpm with 3-sec. pauses at selected phrase/clause/sentence boundaries	university EFL Poland n=36 university ESL Puerto Rico n=70	Wh questions after listening	C>A,B in both samples
	READING COMPREHENSION STUDIES			
Johnson 1981	A. Regular B. Simple syntax & paraphrases	university ESL n=46	m. choice after reading & recall protocols	B>A on recall
Blau 1982	18 passages A. Complex sentences with no surface structure cues B. Complex sentences + surface str. cues C. Simple sentences	university ESL n=85 8th grade ESL n=111 university ESL n=79 p*	m. choice after reading	n.s. (B,A>C trend) p*B>C
Brown 1987	A. NS passage (10th grd. readability B. Modified input (simple syntax, 5th grd. rdbty.)	9th-11th grade n=30	m. choice during reading	B,C>A

	C. Modified interaction (synonyms paraphrase, 9th grade readabty.)			
Tsang 1987	A. Same as B. Brown C. 1987	9th-13th grade n=401	m. choice during reading	B,C>A for 9th & 10th grade
Parker & Chaudron 1987	A. NS passage (redundancy removed, thematic structure reduced using canonical word order throughout) B. Elaborative modification (redundancy, e.g. left-dislocated NPs, added; thematic structure made explicit, e.g. by cleft sentences)	university ESL n=43	cloze in sections after reading parts of passage (explicit thematic structure & redundancy alone & combined vs. NS)	n.s.

Key: s/TU = s-nodes per T-unit; wpm = words per minute
p* = perceived comprehension

While the studies differ in a number of ways, some generalizations are possible. (1) Linguistic simplification improves comprehension of surface propositional content, but is not consistently superior to elaborate modification in those studies in which the elaborative effects can be isolated. (2) Comprehension is consistently improved when elaborative modifications are present. (3) There is some evidence that modifications (of either type) are more useful to learners of lower L2 proficiency. (4) Single adjustments of one type or another are generally not strong enough to have an effect on the comprehensibility of whole passages or lecturettes, but multiple adjustments of one type are.

Simplification and elaboration were conflated in several studies in Figure 1, unfortunately, because the original researchers were interested in a different issue, namely, the question of whether input modified naturally for non-native interlocutors (which often contains examples of both simplification and elaboration) facilitates comprehension. This, together with the generally encouraging early findings, motivated the new study of the comparative effectiveness of simplification and elaboration as approaches to text modification, of which a brief report follows.

(For full details and statistical analyses, see Ross et al, 1991.) Given previous findings, it was hypothesized (1) that readers of both simplified and elaborated texts would comprehend them better than readers of unmodified NS texts, as shown by subjects' scores on the same multiple-choice test, and (2) that there would be no statistically significant difference between the level of comprehension achieved by readers of simplified and elaborated texts.

Method

Subjects

Subjects were 483 Japanese college students, whose EFL proficiency varied from 19 to 70 on the 75-item grammar section of the Comprehensive English Test (CELT, Harris and Palmer, 1982). All had completed eight years of compulsory instruction in English.

Instrumentation

Text types

Reading materials consisted of 13 texts on a variety of topics, each in three forms. The three forms, NS baseline, simplified and elaborated, of one of the shortest passages used in the study, Catfish, are shown in Appendix 1, along with three comprehension questions. Question 1, a replication item, was used in the study. Question 2, a synthesis item, and 3, an inference item, were not used in the study, but have been added to illustrate the three types of questions in the test (discussed below). Descriptive statistics for the readability (Flesch-Kincaide grade level), complexity (mean words per sentence) and total length in words of the 13 passages are shown in Table 1.

Table 1: Characteristics of the three forms of 13 texts used in the study

	Readability (Flesch-Kincaide grade level)	Complexity (words per sentence)	Length (total words)
Unmodified (NS)	12.8	23.7	1563
Simplified	7.5	12.2	1614
Elaborated	14.0	27.6	2458

Table 1 shows that elaborated texts were twice as complex as simplified ones (an average of 27.6 words compared with 12.2 words per sentence), 50% longer, and 6.5 grade levels more advanced in readability (14.0 compared with 7.5). Although this need not be the case, the elaborated texts used here also turned out to be more complex, longer, and 1.2 grade levels more advanced in readability than the NS baseline passages, emulating the pattern shown in the Paco sentences. These differences seem to have had an important influence on the outcome of the study.

Reading Comprehension

A total of 30 items were written to accompany the 13 texts, each item consisting of the correct response and three distractors. They assessed three progressively deeper comprehension processes (see Davey, 1988, for a discussion of reading comprehension item types, and Appendix 1 for sample questions). Replication items require the reader to find a reproduction of the text in the question stem, either word for word or with minor lexical changes, in order to understand factual material in the passage. They are similar to what are sometimes called "surface comprehension" questions. Synthesis items require the reader to connect a number of different, although explicitly stated, facts in the passage, facts which may occur across different sentences or paragraphs. Inference items require the reader to make a deduction about the implications of the text, the basis for which may be the reader's understanding of meanings conveyed anywhere in the text and/or their background knowledge of the topic (a combination of Davey's 'bridging', 'gist' and 'reader-based' inference).

To assess the reliability of the item classification, four EFL reading experts received training in the three-way classification, and then independently coded the thirty reading items as to the process required: replication, synthesis or inferencing. Only 14 items on which at least three of the four experts concurred were retained for analyses of relationships between text types and item types.

Procedures

The study was conducted at various sites in Japan during two regular 90-minute class sessions. In the first session, subjects first completed a 15-item bio-data questionnaire and were then given 45 minutes to complete the structure section of the CELT. At the next class meeting, test booklets, each containing one of the three versions of the thirteen texts, were randomly distributed within each intact

class. This procedure provided the most feasible alternative to true randomization in that the three text versions were distributed equally and randomly within classes. Subjects were given 70 minutes to complete the test, a period assessed as reasonable on the basis of a pilot run of the procedure.

Analysis

The test and survey data were collated into a relational database and sorted by text type. The results of the text distribution procedure were first assessed through an analysis of variance on the CELT scores. It was found, as hoped, that the effect for text type was not significant ($F=.563$, $df=2$, $p<.57$), suggesting that the quasi-random test-distribution procedure had been successful in producing groups of comparable FL reading ability. However, in order to consider the potential interaction of proficiency as measured by CELT and differential comprehension of the three types of passages, adjusted test scores were used in analyses of covariance (ANCOVAs) to assess the effects of text type on comprehension and performance on the three item types. Listwise deletion of cases was necessary to guarantee that the sum of item types contained no missing responses. For this reason, the n-size varied slightly for each test.

Results

Reliability of Measures and Dependability of Item Classifications

Internal consistency estimates (KR-20) for the CELT Structure Test and reading comprehension test are shown in Table 2.

Table 2: Reliability of measures and dependability of item classifications

CELT Structure Test	Reading Comprehension	Experts
.85	.70	.62
Kuder-Richardson-20	Kuder-Richardson-20	Kappa
75 Items	30 Items	4x14 Matrix

The coefficient for the CELT (.85) is acceptably high. That for the reading comprehension test (.70) suggests that the degree of homogeneity for the whole test is relatively low, providing support for the idea that the various item types require different text comprehension processes. The Cohen's Kappa coefficient (.62) is a measure of the reliability of the four experts' three-way classification of the 14 items which survived the "three-out-of-four-or-better" criterion. Kappa is always lower than simple percent agreement indices of inter-rater reliability since, unlike those measures, it corrects for chance agreement. The observed coefficient of .62 falls within the acceptable range for this conservative measure, which is usually put at .60 - .80 (for discussion, see Cohen, 1960; Hartman, 1977; Chaudron, Crookes and Long, 1988).

Effect of Text Type on Reading Comprehension

Observed mean scores for the 30-item reading comprehension test and the same mean scores adjusted for English proficiency, as measured by the CELT Structure Test, are shown in Table 3a.

Table 3a: Observed and adjusted means for reading scores

	n	X	s	Adjusted X
Unmodified (NS)	158	18.4367	4.4298	18.3278
Simplified	163	19.3742	4.2121	19.4794
Elaborated	162	18.8765	4.5160	18.8770
Entire sample	483	18.9006	4.3947	

As shown by the adjusted means, students reading the simplified version of the texts scored highest (x = 19.48), followed by those reading the elaborated version (x = 18.88), with those reading the NS baseline version doing poorest (x = 18.33). The results of the ANCOVA on the adjusted reading scores are presented in Table 3b.

Table 3b: ANCOVA and LSD test for relationship between text-type and adjusted reading scores

EFFECT	SS	df	MS	F	p
Covariate (CELT)	1569.3000	1	1569.3000	98.014	.0000
Text	106.2990	2	52.1494	3.320	.0358
Within	7669.2800	479	16.0110		

LSD: 1. NS x simplified t = 2.58, p < .01, 2-tailed
2. NS x elaborated: t = 1.23, n.s.
3. simplified x elaborated: t = 1.36, n.s.

There was a strong relationship between subjects' English proficiency and their reading comprehension scores (F=98.01, df=1, p<.0000). With the differences in proficiency statistically controlled via the ANCOVA, there was a significant effect for text type (F=3.32, df=2, p<.036). Results of a post hoc Least Significant Difference (LSD) test showed that the primary source of this effect was the statistically significantly higher test scores of subjects who had read the simplified texts compared with scores of those who had read the unmodified NS baseline texts (t=2.58, p<.01). While the elaborated group failed to perform statistically significantly better than the NS baseline group, there was a trend in the data in that direction (t=1.23, p>.05), and no statistically significant difference between the performance of the simplified and elaborated groups (t=1.36, p>.05).

Interaction of Text Type and Item Type

CELT-adjusted mean scores for the three groups' performance on replicative (k=8), synthesis (k=4) and inference (k=2) items are shown in Table 4.

Table 4: Adjusted means for replication, synthesis and inference items

	replication (k=8)	synthesis (k=4)	inference (k=2)
Unmodified (NS)	4.80	3.16	.479
Simplified	5.49	3.29	.513
Elaborated	5.28	3.10	.662

Controlling for EFL proficiency, ANCOVAs were run on relationships between text type and scores for each item type, revealing statistically significant effects for text type on the three groups' performance on replicative items (F=8.90, df=2, p<.0004) and inference items (F=3.30, df=2, p<.037), but not synthesis items (F=-1.94, df=2, p<.142). (For full statistical data, see Ross et al, 1991).

A post hoc LSD test showed that readers of the simplified text scored significantly higher than readers of the NS baseline text on replication items (t=4.14, p<.0001), as did readers of the elaborated texts (t=2.86, p<.01). There was no significant difference between the performance on replication items by readers of simplified and elaborated texts (t=1.26, p>.05). A post hoc LSD test showed that readers of elaborated texts significantly outperformed both readers of unmodified NS texts (t=2.44, p<.02) and readers of simplified texts (t=1.99, p<.05) on inference

items. There was no statistically significant difference between readers of unmodified and simplified texts ($t=.47$, $p>.05$) on inference items.

The interaction of text type and the cognitive tasks that individual test items place on readers suggests that elaboration and simplification differ in fundamental ways. For the reading tasks which require an extraction of information from a text's surface, simplification of the lexis and syntax is sufficient. Conversely, for the linking of propositional content across sentence boundaries, and for making generalizations about the relation of a text to knowledge of the world, elaborative modifications are indicated. The question of interest is why text elaboration, which, in terms of readability indices, should make a text more difficult to process, in fact leads readers to make more accurate inference about the propositions in a text. One approach to examining how texts are enriched by elaborative modification is to consider how propositional content is affected by both simplification and elaboration.

Effects of Modifications on Message Content

Comprehension of inference items requires a linkage from the written text to pragmatic implicature. Information from the text, if comprehended accurately, implies that propositions contained within the text are related in specific ways. It is perhaps for this reason that elaborative extensions of textual information, even though they increase the processing burden through greater clause length, appear to improve the accuracy of responses to items requiring inferencing. The technique of elaboration, using parenthetical expansion of key terms and concepts in the original text, provides the reader with a "second look" at those terms and concepts and consequently increases the chance that inferencing about them can be stimulated in the reading process. Inferencing is optimized when textual coherence is established through repetition of major propositions within a text (Kintsch, 1974; Kintsch and van Dijk, 1978; Omanson et al 1984). As second language readers are particularly constrained by short term memory limitations, they need to use chunking strategies in order to summarize their schematic understanding of the text on an incremental basis. Textual elaboration facilitates the repetition of propositional meanings because key propositions are restated across processing cycles, which roughly correspond to clause or sentence units. In Kintsch and van Dijk's model (1978), the most salient (recognized) propositions and those that most immediately follow them are the primary candidates for associative linkage within processing cycles. As a reader makes inferences about propositions across processing cycle boundaries, the probability of recalling those propositions increases.

A propositional analysis of three versions of one of the passages used in this study reveals differences between the information available to the reader across the three text-types, and demonstrates how elaboration of textual material creates a critical mass of propositional information which aids inferencing. Since it has already been discussed from a complexity standpoint and included in Appendix A, Catfish is again chosen for the illustration.

A. Baseline (NS) version

Propositions	Text
1. EXIST:catfish	Catfish have both gills for use under water and lungs for use on land,where they can breathe for twelve hours or more. The hot daytime sun would dry them out, but they can slip out of their ponds at night and still stay cool while they hunt for food. They are meat eaters, so they search for worms, insects and other fish, and can often be seen crossing roads at night while on these hunting expeditions.
2. HAVE:catfish,gills	
3. HAVE:catfish,lungs	
4. USE:catfish,gills,underwater	
5. USE:catfish,lungs,on land	
6. BREATHE:catfish,on land	
7. BREATHE:catfish, 12 hours+	
8. BE:sun,hot	
9. BE:sun,daytime	
10. DRY:sun,catfish	
11. SLIP OUT:catfish,ponds	
12. SLIP OUT:catfish,at night	
13. STAY COOL:catfish,at night	
14. HUNT:catfish,at night	
15. HUNT:catfish,food	
16. EAT MEAT:catfish	
17. SEARCH:catfish,worms	
18. SEARCH:catfish,insects	
19. SEARCH:catfish,fish	
20. SEE:catfish,at night	
21. CROSS:catfish,roads	
22. CROSS:catfish,at night	

In this analysis, each proposition is listed according to its predicates and arguments. For the unmodified version of the Catfish story, propositions were presented in a linear manner. The simplified version, B, below, which was modified syntactically to reduce clause length and utilize high frequency vocabulary, presents the same major propositions, but does so with a more limited use of descriptive modifiers. Thus, syntactic simplification has the effect of bleeding information from the text in a way that serves to present propositions in their skeletal form. Carrell (1987) notes that lexical and syntactic simplification of texts for the purpose of controlling 'readability' may actually make such texts more difficult to comprehend because semantically rich modifiers and transitional markers are typically prime candidates for deletion.

B. Simplified version

Propositions	Text
1. EXIST:catfish 2. HAVE:catfish,gills 3. HAVE:catfish,lungs 4. USE:catfish,gills,underwater 5. USE:catfish,lungs,on land 6. BREATHE:catfish,on land 7. BREATHE:catfish, 12 hours+ 8. SLIP OUT:catfish, at night 9. SLIP OUT:catfish, ponds 10. MOVE:catfish,at night 11. STAY COOL:catfish,at night 12. BE:sun, hot 13. DRY:sun,catfish 14. HUNT:catfish,at night 15. EAT MEAT:catfish 16. SEARCH:catfish,worms 17. SEARCH:catfish,insects 18. SEARCH:catfish,fish 19. OBSERVE:people,catfish 20. CROSS:catfish,roads 21. CROSS:catfish,at night 22. HUNT:catfish,at night	Catfish have both gills and lungs. The gills are used for breathing under water. The lungs are for use on land. The fish can breathe on land for twelve hours or more. At night these fish can slip out of ponds. They move at night so they can stay cool. The hot sun would dry them out. They hunt at night, too. They are meat eaters. They search for worms, insects and other fish. People often observe them crossing roads at night when the fish are hunting.

C, below, is the elaborated version. As can be seen, the modifications used to produce it resulted in a larger number of propositions. With the increased amount of detailed information available, the probability that readers can link information across sentence boundaries, and relate one proposition to another, most likely also increases, leading to the improved level of accuracy of readers' inferences about the major propositions in the text.

C. Elaborated version

Propositions	Text
1. EXIST:catfish	Catfish have two systems breathing: gills, like other fish, for use under water, and lungs, like people, for use on land, where they can breathe for twelve hours or more. Catfish would dry out and die from the heat of the sun, so they stay in water during the day time. At night, on the other hand, they can slip out of their ponds and still stay cool while they hunt for food. They are meat eaters, so they hunt for worms, insects and other fish. People travelling at night often see catfish crossing roads when they are out on these hunting expeditions.
2. HAVE:catfish,two systems	
3. HAVE:catfish,gills	
4. HAVE:other fish,gills	
5. USE:catfish,gills,under water	
6. HAVE:catfish,lungs	
7. HAVE:people,lungs	
8. USE:catfish,lungs,on land	
9. BREATHE:catfish,on land	
10. BREATHE:catfish, 12 hours +	
11. DRY OUT:sun,catfish	
12. DIE:catfish, from heat	
13. STAY:catfish,water	
14. STAY:catfish,daytime	
15. SLIP OUT:catfish,at night	
16. STAY COOL:catfish,at night	
17. HUNT:catfish,at night	
18. HUNT:catfish,food	
19. EAT MEAT:catfish	
20. HUNT:catfish,worms	
21. HUNT:catfish,insects	
22. HUNT:catfish,other fish	
23. TRAVEL:people:at night	
24. SEE:people,catfish	
25. CROSS:catfish,roads	
26. CROSS:catfish,at night	
27. BE OUT:catfish,at night	
28. HUNT:catfish,at night	

The unmodified version of the text about catfish (Form A) contains 22 propositions. Seven predicates are repeated twice, and one appears three times. The ratio of propositions to repetition is one. Much like the unmodified version, the syntactically simplified Form B contains the same number of propositions, but these are expressed by a larger number of predicates. Although more predicates are used, the ratio of proposition to repetition is very similar to the unmodified version. The majority of predicates appear only once in the text (8 out of a total of 14). The simplified version can therefore be seen as one that presents the same number of ideas, but in a manner that does not rely on recycling of key predicates, and may in fact require more unaided recognition of basal verbs than does the unmodified version.

The elaborated version contains the largest number of propositions (28), and also utilizes the greatest degree of repetition, with two of the key predicates in the story appearing at least five times. The ratio of proposition to repetition is roughly twice that seen in either the unmodified or simplified versions. According to Kintsch and van Dijk (1978), the probability of propositional recall increases with the gross number of instances of propositional repetition. Inferencing across propositions can also be seen as contingent on the process of recycling. The observed differences in propositional repetition between the texts in this study suggests that the basis for the superior performance of the readers of the elaborated version on the inferential test questions is related to the repeated accessability of story-line propositions in a variety of extended and embellished clauses. This approach stands in clear contrast to the strategy implied by syntactic simplification (Form B), since the Flesch-Kincaide Readability of the elaborated version (17.3) suggests that the text should be more than twice as difficult as the simplified version.

The results of this study indicate that the type of reading task, i.e. inferencing, may interact with the modifications made on the text in a way that make simplification useful for only a very limited range of superficial pedagogical devices.

Discussion

Effect of Text Type on Reading Comprehension

There were three main hypotheses as to the effect of text-type on FL reading comprehension. Hypothesis (1) was supported: students who read the linguistically simplified passages scored statistically significantly higher on the 30-item multiple-choice comprehension test than students who read the unmodified (NS) versions of the same passages. Hypothesis (2) was not supported: students who read the elaborated versions of the passages scored higher than those who read the unmodified (NS) versions, but not statistically significantly so. Hypothesis (3) was supported: there was no statistically significant difference between the reading scores of students who read the simplified and the elaborated versions of the passages.

These results are broadly consistent with those of previous studies. Simplification and elaboration were again both shown to improve comprehension. Simplification was more effective than elaboration when scores of readers of simplified and elaborated passages were compared with those of readers of unmodified (NS) passages, but it was not statistically significantly superior to elaboration, as shown by the lack of a statistically significant difference between scores of readers of simplified and elaborated texts.

Consistent with previous findings, elaboration improved comprehension, but not as much as in some earlier studies. As shown in Table 2, the reason for this almost certainly lies in the fact that, as an accidental by-product of the elaboration process, elaborated passages in this study were an average of one grade level harder in readability, 16% more complex in words per sentence, and nearly 60% longer than the unmodified (NS) passages. Each of these qualities must have worked against students reading the elaborated texts, their greater length potentially being especially problematic given that the same amount of time was allowed subjects in all three groups. Subjects in the elaborated condition had to read more material and answer the comprehension questions faster than subjects in the other two groups. The fact that the elaborated texts were more difficult than the unmodified (NS) texts by all three of these traditional criteria makes it surprising that subjects reading them did as well as they did, and means that hypothesis (2) was tested under very unfavorable conditions.

The predicted lack of a statistically significant difference between the groups reading the elaborated and simplified texts on the general reading measure provides even more remarkable evidence of the power of elaboration for non-native readers, given that the elaborated texts were an average of six grade levels harder in readability, 125% more complex in words per sentence, and 50% longer than the simplified ones. Elaboration of the input made it possible for one group of FL readers to perform at a level comparable to that of another group despite the fact that the second group's reading task was much easier as assessed by traditional criteria. They did this, moreover, while being exposed to more authentic target language models and to more unknown vocabulary and syntax. This is important when one remembers that one function of their classes was to improve their comprehension of passages like these, but that another was to teach them new vocabulary and grammar.

Interaction of Text Type and Item Type

There is some evidence from the findings of this study of an interaction between the kind of modifications made to a text and the depth of processing non-native readers can achieve. The trend is for both simplification and elaboration to assist readers in extracting low level, surface information from a passage, but for elaboration to become more useful as the depth of processing required by a reading task increases.

Elaboration, including parenthetical expansion of key terms and concepts in the original text, may be successful because it provides the reader with a "second look" at terms and concepts and consequently increases the chance that inferencing about them can be stimulated in the reading process. In contrast to elaborated texts, unmodified and simplified texts provide less context for stimulating the deeper pragmatic linkage necessary for inferring the consequences of passage meanings. Unmodified texts probably fail because concepts are obscured by the structural and lexical detail. Simplified texts probably fail because they strip away the richness of detail helpful for a reader to perceive a text's implications.

Conclusion

Readers of 13 simplified texts performed slightly better, although not statistically so, than readers of 13 elaborated texts when both groups were tested on their comprehension of passage content, despite the fact that the elaborated texts were considerably more difficult by traditional linguistic criteria. In the process, however, readers of the simplified texts were denied access to more authentic models of target language use and to some of the vocabulary and grammatical items they eventually needed to learn, whereas readers of elaborated texts experienced both. The results suggest that the time has come for teachers and materials writers to take such findings into account and adopt elaboration as an approach to modifying reading comprehension materials for foreign and second language learners. Elaboration would seem to serve the twin purposes of most FL and SL reading lessons, namely, (1) improving comprehension and (2) providing learners with the raw data they need for language development in the form of access to unknown linguistic items in classroom input. Given earlier similar findings on listening comprehension, elaboration would seem to constitute as viable an alternative to simplification for the presentation of both spoken and written discourse to foreign and second language learners.

As was the case here, elaboration can sometimes result in texts which on the surface are linguistically more complex, although cognitively simpler, than the original versions, since some changes, such as rephrasing, repetition and clefting to highlight thematic structure, inevitably produce greater sentence length, for example. There is no obvious reason to confront students with texts that are more complex than those they will encounter outside the classroom. When there is a danger of this happening during the preparation of classroom materials, the situation is easily remediable. One obvious solution is to break up the occasional overly long or syntactically complex sentence after elaboration has been completed, in other words, ironically, to apply one of the most traditional text simplification strategies - but to elaborated, rather than unmodified, texts.

If a simple extraction of explicitly stated factual information is called for by a reading task, it is possible that syntactic and lexical simplification will be sufficient aids for non-native readers. In the 1990's many students are being prepared for more than this in their English classes, however, especially, but not only, in content-based, sheltered subject-matter, task-based, and immersion programs. If the purpose of pedagogical materials in these and other more conventional FL and SL programs is to provide opportunities for more effective learning strategies to be implemented, including the ability to process texts at a deeper level, elaboration should again be considered. The study's findings suggest that elaborative modification serves to provide semantic detail foreign language readers find helpful when making inferences from texts. Second language learners need listening and reading materials that stimulate them intellectually, that jointly trigger the process of understanding language from context and content from language.

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Appendix 1: Three Versions of a Text, and Accompanying Comprehension Questions.

Catfish

3A Unmodified (NS)

Catfish have both gills for use under water and lungs for use on land, where they can breathe for twelve hours or more. The hot daytime sun would dry them out, but they can slip out of their ponds at night and still stay cool while they hunt for food. They are meat eaters, so they search for worms, insects and other fish, and can often be seen crossing roads at night while on these hunting expeditions.

3B Simplified

Catfish have both gills and lungs. The gills are used for breathing under water. The lungs are for use on land. The fish can breathe on land for twelve hours or more. At night these fish can slip out of ponds. They move at night so they can stay cool. The hot sun would dry them out. They hunt for food at night, too. They are meat eaters. They search for worms, insects and other fish. People often observe them crossing roads at night when the fish are hunting.

3C Elaborated

Catfish have two systems for breathing: gills, like other fish, for use under water, and lungs, like people, for use on land, where they can breathe for twelve hours or more. Catfish would dry out and die from the heat of the sun, so they stay in water during the daytime. At night, on the other hand, they can slip out of their ponds and still stay cool while they hunt for food. They are meat eaters, so they hunt for worms, insects and other fish. People travelling at night often see catfish crossing roads when the fish are out on these hunting expeditions.

Questions

1. (Replication)
Catfish breath through
a) gills in and out of water
b) gills in water only
c) lungs in and out of water
d) gills for 12 hours only

2. (Synthesis)
Catfish eat
a) only at night
b) different kinds of food
c) only when it is cool
d) mostly insects

3. (Inference)
Catfish
a) prefer meat to fish
b) are a threat to motorists
c) are adaptable predators
d) can live on land for as long as in water